"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

These were annealed at 800 to 900°C, the annealing temperature for each alloy having been selected so as to obtain the same grain-size (approx. 0.1 mm) in all test pieces. The rate of plastic deformation varied between 10^{-4} and 10^{-11} (sec^{-1}). In the first stage of the investigation, the effect of alloy composition and experimental conditions on the rate of deformation $\dot{\varepsilon}$ was studied. The results relating to steady creep are reproduced in Fig.1, where log $\dot{\varepsilon}$ (sec^{-1}) is plotted against the Cu content (%) in the alloys tested at 5 kg/mm^2. The test temperature is indicated by each curve. In Fig.2, log $\dot{\varepsilon}$ (sec^{-1}) is plotted against the Cu content (%) in alloys tested at 600°C, the magnitude of the applied stress (2 and 9 kg/mm^2) being indicated by each curve. In the next stage of the investigation the relationship between the applied stress σ and the activation energy Q of the deformation process was studied. The results are reproduced graphically. In Fig.5, Q (kcal/mol) is plotted against σ (kg/mm^2), the experimental points denoted by crosses, circles and dots relating, respectively, to pure nickel, 40% Cu-Ni alloy and 60% Cu-Ni alloy. In Fig.6, log $\dot{\varepsilon}$ (sec^{-1}) is plotted against $10^3/T$ (where T is the absolute temperature) for the 40% Cu-Ni

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alloy tested under conditions of stress relaxation, curves 1 to 7 relating, respectively, to σ = 0.4, 0.6, 0.8, 1.0, 1.2, 1.4 and 1.6 kg/mm^2. Fig.7 shows the same relationship for the 40% Cu-Ni alloy tested under conditions of creep, curves 1 to 4 relating, respectively, to σ = 2, 3, 4 and 5 kg/mm^2. Finally, the effect of applied stress and temperature on the rate of deformation was determined. Some of the results are reproduced in Fig.8 and 9. In Fig.8, $\dot{\epsilon} \times 10^9$ (sec^{-1}) is plotted against σ (kg/mm^2) for the 40% Cu-Ni alloy tested at 600°C, Fig.9 showing the same relationship for the 60% Cu-Ni alloy. Correlation of these with results of X-ray diffraction analysis, data obtained by other workers, and theoretical considerations led the present authors to the following conclusions. (1) The processes of creep and relaxation can be regarded as a result of a complex interaction between deformation by slip and diffusion. The relative part played by each of these mechanisms depends on temperature and on the magnitude of the applied stress. (2) Under the conditions of low temperature and high applied stresses, the plastic deformation in creep can be described by the expression, due to S.N.Zhurkov,

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$$\dot{\varepsilon} = \dot{\varepsilon}_0 e^{-\frac{Q - \gamma\sigma}{RT}}$$

High activation energy and the fact that the above relationship is valid for low temperature and high rates of deformation indicates that under these conditions plastic deformation in creep takes place predominantly by the mechanism of slip. (3) Under conditions of high temperature and low applied stresses, the activation energy for the deformation increases with decreasing stress and approaches the activation energy for the diffusion of the alloying element. In this case the process of deformation in creep can be described by the known equation for plastic deformation by diffusion:

$$\dot{\varepsilon} = \frac{D\sigma a^3}{\ell^2 kT}$$

Under these conditions of deformation the strength of alloys decreases and may be lower than that of unalloyed metal which indicates the predominance of the diffusion mechanism of deformation.
Card 5/8

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(4) In the intermediate region of temperature and stress, plastic deformation by slip takes place side by side with the diffusion relaxation process. The results of X-ray analysis indicate that under these conditions the plastic deformation brings about fragmentation of the crystals and formation of blocks. In this case the deformation in creep is approximately described by the formula due to J.J.Weertman (Ref.28: J.Appl.Phys., 1955, 26, 1213)

$$\dot{\varepsilon} = C\left[\sigma^{\alpha}/RT\right] \exp(-Q/RT)$$

There are 12 figures, 3 tables and 28 references: 18 Soviet and 7 non-Soviet. The four most recent references to English language publications read as follows: Ardley G.W. Acta met., 1955, 3, 525; Greenough A.P. Phil. Mag., 1958, 3, 1032; McLean D. Inst.Metals, 1952-53, 81, 287; Weertman J. J.Appl.Phys., 1955, 26, 1213.

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals AS USSR)

SUBMITTED: December 22, 1960

Card 6/8

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

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10.7300 1413, 1327, 1454

32657
S/126/61/012/005/017/028
E091/E335

AUTHORS: Pavlov, V.A., Gaydukov, M.G. and Mel'nikova, V.V.

TITLE: Mechanism of plastic deformation in the creep of aluminium-magnesium alloys

PERIODICAL: Fizika metallov i metallovedeniye, v. 12, no. 5, 1961, 748 - 755

TEXT: Pure aluminium and aluminium alloys containing 0.1, 1 and 2% Mg were investigated. The alloys were melted under flux in a high-frequency furnace. The ingots were forged into rods of 18 mm diameter, from which specimens 50 mm long and 8 mm in diameter were made for creep-testing and other 100 mm long and 8 mm in diameter for stress-relaxation testing. The specimens were annealed at 420 - 440 °C. For each alloy, the annealing temperature was selected so that a linear grain diameter of 0.1 mm should be obtained. The rate of plastic deformation was chosen within the limits 10^{-4} sec^{-1} to 10^{-10} sec^{-1}. Rates below 10^{-8} sec^{-1} were obtained during stress-relaxation and the higher rates in creep. The mechanism of plastic deformation could be

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Mechanism of plastic ....

judged from the dependence of the rate of deformation on solid-solution concentration, from the energy of activation and its dependence on stress and from the dependence of the rate of deformation on stress. It was found that the mechanism of plastic deformation under conditions of creep and stress relaxation, both in Al-Mg and Ni-Cu alloys, underwent a change on varying the conditions of deformation. As a result of such changes, diffusion processes begin to play an ever-increasing role with increase in temperature and decrease in deformation stresses. At relatively low temperatures and high deformation stresses, the mechanism of plastic deformation is governed by slip. The diffusion mechanism predominates in the region of high temperatures and low stresses. Plastic deformation by slip takes place in the intermediate range of temperature and stresses in conjunction with relaxation processes. Alloying Al with Mg leads to an extension of the stress range in which diffusion processes play a noticeable role in plastic deformation. This extension is due to the increased resistance to the development of deformation by slip and due to a greater decrease in the energy

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Mechanism of plastic ....

of activation with increase in stresses in the alloys as the diffusion mechanism of plastic deformation procees. S.N.Zhurkov, T.P. Sanfirova, B.Ya. Pines and A.F. Sirenko are mentioned in the article in connection with their contributions in this field. There are 11 figures, 1 table and 18 references: 14 Soviet-bloc and 4 non-Soviet-bloc. The four English-language references mentioned are: Ref. 9: F.R. Nabarro - Rep. Conf. Strength of Solids, L, 1948, 75; Ref. 10: C.J. Herring - J. Appl. Phys., 1950, 21, no. 5, 437; Ref. 11: J.J. Weertman - J. Appl. Phys., 1955, 26, 1213; Ref. 18: F.H. Buttner, E.R. Funx, H. Udin - J. Metals, 1952, 4, 401.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals of the AS USSR)

SUBMITTED: March 27, 1961

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

S/123/62/000/015/002/013
A052/A101

AUTHORS: Sadovskiy, V. D., Sokolkov, Ye. N., Lozinskiy, M. G., Petrova, S. N., Antipova, Ye. I., Gaydukov, M. G., Mirmel'shteyn, V. A.

TITLE: The effect of thermomechanical treatment on refractory properties of austenitic steel

PERIODICAL: Referativnyy zhurnal, Mashinostroyeniye, no. 15, 1962, 21, abstract 15A115 (In collection: "Issled. po zharoprochn. splavam". T. 7, Moscow, AN SSSR, 1961, 202 - 209)

TEXT: The effect of thermomechanical treatment on the change of structure of austenitic alloyed steel in the process of high-temperature stretching in a vacuum (at 900°C and 950 kg/mm^2 stress) and on the rupture strength at 650°C (σ = 35 and 38 kg/mm^2) was studied. The thermomechanical treatment consisted of rolling with 25 - 30% reduction in area and 5.7 m/min. speed at 1,000 - 1,100°C and a subsequent water hardening. It is pointed out that thermomechanical treatment increases the rupture strength and inhibits the process of creep rupture; this is explained by the characteristics of the structure forming at a high-tem-

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A052/A101

The effect of thermomechanical...

perature plastic deformation. There are 16 references.

[Abstracter's note: Complete translation]

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30595
S/126/62/013/003/007/023
E193/E383

18.1710

AUTHORS: Petrova, S.N., Gaydukov, M.G. and Smirnov, L.V.

TITLE: The effect of thermomechanical treatment on creep-resistance of nickel

PERIODICAL: Fizika metallov i metallovedeniye, v. 13, no. 3, 1962, 380 - 386

TEXT: Thermomechanical treatment (TMO) constitutes a new method of improving the strength of steels and other alloys by means of hot plastic deformation, followed immediately by quenching. The treatment has been extensively studied both in the Soviet Union and abroad but the interpretation of the results has been somewhat difficult owing to the fact that the changes observed could be attributed both to TMO and to the effect of solid-state transformations taking place in the alloys studied - hence the present investigation carried out on technically pure nickel. Square cross-section test pieces (11.5 x 11.5 x 70 mm) were heated to 1 100 °C, cooled in the furnace to 800 °C, hot-rolled at this temperature to 25% reduction at a rolling speed of 11 m/min and then immediately quenched in water. Another series

Card 1/3

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The effect of ....

of test pieces was subject to the same heating/cooling cycle without, however, plastic deformation at 800 °C. Creep tests were carried out at 500 °C on test pieces of each series. The results are reproduced in Fig. 3, where the stress (σ, kg/mm^2) is plotted against time-to-rupture (τ_p, hrs), the continuous and broken curves relating, respectively, to material subjected to TMO and to the pilot test pieces. The rate of steady creep amounting to 1.1×10^{-1} %/hr for the pilot test pieces was 3.5×10^{-4} %/hr for material subjected to TMO. Since it could be postulated that the higher creep resistance of specimens subjected to TMO was due to their higher hardness (100 BHN as compared with 60 BHN of nickel quenched from 800 °C), a supplementary series of tests was carried out on specimens given the following treatment: heating to 1 100 °C; quenching; 25% reduction by rolling at 300 °C and 12 hours annealing at 500 °C. The results are reproduced in a table. It will be

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The effect of ....

seen that also in this case the material subjected to TMO exhibited better creep properties. These results, combined with the results of metallographic examination, led the present authors to the conclusion that the improvement brought about by TMO was associated with the high stability of lattice distortions caused by this treatment, both in the interior of the grains and, particularly, in the grain-boundary regions. In addition, the grain boundaries themselves become distorted in such a way that they inhibit the propagation of cracks under conditions of intercrystalline fracture, thus increasing considerably the time-to-rupture under a given stress. There are 7 figures and 1 table.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals of the AS USSR)

SUBMITTED: November 17, 1961

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

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40973

18.8200

S/659/62/009/000/003/030
I003/I203

AUTHORS: Pavlov, V. A., Gaydukov, M. G., Noskova, N. I., and Mel'nikova

TITLE: The slip and diffusion nature of plastic deformation during creep of nickel-copper alloys

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam v. 9. 1962. Materialy Nauchnoy sessii po zharoprochym splavam (1961 g.), 23–30

TEXT. There are controversial ideas on the mechanism of plastic deformation under conditions of creep. This work shows that the processes of creep and of relaxation are the results of both slip and diffusion. The authors conclude that: 1) At low temperatures and under high stresses, the deformation is due chiefly to slip. 2) At high temperatures and under low stresses the diffusion process prevails. 3) For an intermediate range of stresses and temperatures plastic deformation is the result of slip and relaxation is the result of diffusion. The relationship between the rate of creep on the one hand and the temperature and stress on the other, can in this case be expressed by the equation: $E = C(\sigma^*/RT)\exp(-\varphi/RT)$. In his reply, K. A. Ospiov proclaimed that no proofs have been given in this work for the existence of a diffusion process during creep. In his opinion the fact that the activation energy is equal to that of self-diffusion as found by the authors is not sufficient proof that such a process takes place. There are 4 figures and 2 tables.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

19 (200)

40678
S/126/62/014/002/012/018
E193/E383

AUTHORS: Pavlov, V.A., Gaydukov, M.G. and Mel'nikova, V.V.

TITLE: Dependence of the mechanism of plastic deformation in creep of Ni-Al and Ni-Co alloys on the conditions of deformation

PERIODICAL: Fizika metallov i metallovedeniye, v. 14, no. 2, 1962, 275 - 282

TEXT: In continuation of their earlier work on the mechanism of creep of Ni-Cu and Al-Mg alloys, the present authors investigated the effect of various factors on the mechanism of creep of Ni-Al and Ni-Co alloys. The Ni-Al alloys, containing up to 3% Al were chosen as one of the experimental materials because they represented alloys characterized by relatively large static lattice distortions and non-monotonic concentration-dependence of the elastic modulus. In contrast, the lattice distortions in Ni-Co alloys (with up to 60% Co) were relatively small and their elastic modulus was practically independent of the composition. The creep tests were carried out at 500 and 800 °C, the rate of

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Dependence of ....

creep varying between 10^{-4} and 10^{-2} sec^{-1}. The results are reproduced in the form of graphs, showing: concentration-dependence of the rate of creep under various applied stresses; relationship between the rate of creep and the yield point; stress-dependence of the activation energy for creep of the alloys studied; stress- and temperature-dependence of the rate of creep. The conclusions reached can be summarized as follows. 1) Slip is the predominant mechanism of plastic deformation in creep at relatively low temperatures and high stresses. The relationship between the rate of creep under these conditions, on the one hand, and temperature and stress, on the other, can be described by an expression due to Zhurkov and Sanfirova (DAN SSSR, 1955, 101, no. 2, 257):

$$\dot{\varepsilon} = \dot{\varepsilon}_o e^{-\frac{Q-\gamma\sigma}{RT}} \qquad (1)$$

where Q is the activation energy for creep at $\sigma = 0$ and $\dot{\varepsilon}_o$ and γ are constants. Under these conditions, the rate of

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Dependence of ....

creep can be correlated with the yield point of the alloy.
2) In creep at high temperatures and under low stresses the diffusion mechanism of plastic deformation predominates and there is a definite temperature and stress range within which the rate of creep increases linearly with increasing stress.
3) In the intermediate range of stress and temperature deformation by slip takes place side-by-side with the relaxation processes. The approximate rate of creep can be obtained, under these conditions, from an equation due to J.J. Weertman (J. Appl. Phys., 1955, 26, 1213):

$$\dot{\varepsilon} = c(\sigma^{\alpha}/RT)\exp(-Q/RT) \qquad (2)$$

where Q is the activation energy for diffusion,
σ is the stress and
α a coefficient equalling 3-4.
4) The range of temperature and stress in which the diffusion mechanism of deformation predominates is wider in alloys than in pure metals. The same applies to the range in which plastic

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deformation in creep is described by Weertman's equation. Thus, the stress dependence of the activation energy for creep ceases to be linear at 6 - 7 kg/mm^2 for pure nickel and at 10-12 kg/mm^2 for the 60% Co-Ni alloy.
5) The onset of the diffusion mechanism of plastic deformation in the alloys studied is facilitated by polygonization.
There are 12 figures.

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals, AS USSR)

SUBMITTED: July 28, 1961 (initially)
March 2, 1962 (after revision)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

SADOVSKIY, V.D.; SOKOLKOV, Ye.N.; LOZINSKIY, M.G.; PETROVA, S.N.; ANTIPOVA, Ye.I.; GAYDUKOV, M.G.; MIRMEL'SHTEYN, V.A.

Effect of hot working on the heat-resistant properties of austenitic steel. Issl. po zharopr. splav. 7:202-209 '61. (MIRA 14:11)
(Steel alloys--Thermal properties) (Rolling (Metalwork))

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, G.V.; GAYDUK, V.G.

Production of plastic vinarium. Izv. Sib. otd. AN SSSR no.7: 29-36 '62 (MIRA 17:8)

1. Ural'skiy filial AN SSSR, Sverdlovsk.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

PAVLOV, V.A.; GAYDUKOV, M.G.; MEL'NIKOVA, V.V.

Dependence of the mechanism of plastic deformation during creep on deformation conditions in Ni-Al and Ni-Co alloys. Fiz. met. i metalloved. 14 no.2:275-282 Ag '62. (MIRA 15:12)

1. Institut fiziki metallov AN SSSR.
(Creep of nickel) (Deformations (Mechanics))

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

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2

L 17699-65 EWT(m)/EWP(w)/EWA(d)/EWP(k)/EWP(t)/EWP(b) Pf-4/Pad MJW/JD/HW

ACCESSION NR: AP4042041 S/0126/64/017/006/0845/0852

AUTHOR: Sadovskiy, V. D.; Sokolkov, Ye. N.; Petrova, S. N.; Pavlov, V. A.; Gaydukov, M. G.; Noskova, N. I.; Kagan, D. Ya.

TITLE: The effects of high-temperature thermo-mechanical treatment on the heat resistance of KhN77TYuR alloy

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 6, 1964, 845-852

TOPIC TAGS: nickel alloy, chromium containing alloy, aluminum containing alloy, creep rate, recrystallization, boron containing alloy, KhN77TYuR alloy, thermo mechanical treatment, heat resistance

ABSTRACT: The method of hot plastic deformation combined with quenching was used to enhance the stress-rupture strength of austenitic steels. The authors investigate the possibility of applying this combined method to KhN77TYuR, a ilmonic-type alloy. Specimens 11.5 x 11.5 x 70 mm were annealed at 1080C for 8 hr. and rolled with a reduction of 25% at a rolling speed of 1.5 m/min. The process

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of recrystallization was suppressed by water cooling the specimens immediately after plastic deformation. All specimens were aged at 750C for 15 hr. Hardness was 285 HB. At 550C and under a stress of 90 kg/mm^2, the rupture life was extended from 4 to 100 hr while the creep rate decreased from 4-8 x 10^{-2}% to 8 x 10^{-1}% per hr. Above the 500—600C range a deterioration of strength characteristics was observed. The authors attribute the adverse effect of the combined method at 750C to the recrystallization during testing and to a possible higher rate of coagulation of the strengthening phase. The decrease in the creep rate and the increase of the rupture life were verified by x-ray method. The authors point out the formation of a polygonized substructure and to a boundary distortion in the form of characteristic serration during high-temperature deformation. They contend that the substructural boundaries impeded the travel of dislocations during creep, while the distortion of the grain boundaries lowered the susceptibility to intercrystalline failure. The authors suggest that the method of investigation may be insufficiently developed for an exhaustive interpretation of the results obtained and of the peculiarities of the structural state of the material. Orig. art. has: 5 figures.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

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ACCESSION NR: AP4042041

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of the Physics of Metals AN SSSR)

SUBMITTED: 12Jul63 ENCL: 00 SUB CODE: MM

NO REF SOV: 012 OTHER: 008

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L 16301-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pf-4 IJP(c)/AFWL MJW/
ACCESSION NR: AP4046094 JD/HW/JT S/0126/64/018/003/0437/0442

AUTHOR: Buly*chev, D. K.; Beresnev, B. I.; Gaydukov, M. G.; Marty*nov, Ye. D.; Rodionov, K. P.; Ryabinin, Yu. N. B

TITLE: Healing porosity and cracks in metals by plastic deformation under high hydrostatic pressure

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 3, 1964, 437-442

TOPIC TAGS: metal defect, hydrostatic pressure, defect healing

ABSTRACT: Experiments have been conducted to explore the possibility of eliminating defects in metals with high hydrostatic pressure. The M2 copper specimens with artificial defects such as microcavities and microcracks were subjected to a hydrostatic pressure of up to 100,000 atm. Compression on accompanied by plastic deformation was found to have no effect on the number or size of defects, since it created mainly elastic deformation and only an insignificant amount of plastic deformation. However, when defective specimens were subjected to a tensile test under hydrostatic pressure, the defects were either

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ACCESSION NR: AP4046094

2

entirely eliminated or was reduced in size to such an extent that they could not be discovered by optical microscope and did not effect adversely mechanical properties of the metal (see Fig. 1 of the Enclosure). The intensity of defect healing increases with the increasing pressure and plastic deformation. Orig. art. has: 4 figures.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals, AN SSSR); Institut fiziki zemli AN SSSR (Institute of Physics of Earth, AN SSSR)

SUBMITTED: 20Nov63 ENCL: 01 SUB CODE: MM

NO REF SOV: 009 OTHER: 002

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

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ACCESSION NR: AP4046094

ENCLOSURE: 01

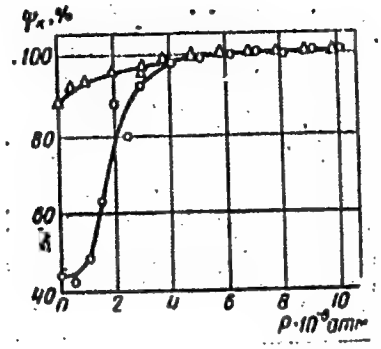

Fig. 1. Ductility of sound (1) and defective (2) specimens of M2 copper versus hydrostatic pressure

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ACCESSION NR: AP5001248 S/0126/64/018/005/0778/0783

AUTHOR: Beresnev, B. I.; Bulychev, D. K.; Caydukov, M. G.; Martynov, Ye. D.; Rodionov, K. P.; Ryabinin, Yu. N.

TITLE: Healing of pores and cracks in copper by extrusion with a high-pressure fluid

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 5, 1964, 778-783

TOPIC TAGS: copper, copper defect, metal defect, density defect healing

ABSTRACT: The healing of microscopic pores and cracks in metal by plastic deformation has been investigated. Specimens of sound copper and copper with artificially produced pores and cracks were hydrostatically extruded or drawn with a 5—68% reduction at room temperature. Both methods of deformation increased the tensile and yield strengths, reduction of area, and density of both sound and defective specimens; extrusion did so to a greater extent than drawing (see Figs. 1 and 2 of the Enclosure). The mechanical properties and density of defective copper changed slightly with small reductions (5—8%) but increased appreciably with increasing reduction; with a reduction of 40% they

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ACCESSION NR: AP5001248

2

practically equalled those of the sound copper, evidently due to the elimination of pores and cracks. In drawing, the strength of defective copper at a reduction of 75% decreased, probably because the metal began to fail. Examination of the microstructure showed the number of pores decreases with increasing reduction, regardless of the deformation method. However, the pores completely disappeared after a 40% reduction by extrusion, but still remained after a 60—70% reduction by drawing. Orig. art. has: 5 figures.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of the Physics of Metals, AN SSSR); Institut fiziki Zemli AN SSSR (Institute of Physics of the Earth, AN SSSR)

SUBMITTED: 22Nov63 ENCL: 02 SUB CODE: MM

NO REF SOV: 006 OTHER: 004 ATD PRESS: 3155

Card 2/4

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

L 1[illegible] EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(h) Pf-4 IJP(c)/AFETR/
AFWL/ASD(mp)-2/ESD(gs)/ESD(t) JD/HW

ACCESSION NR: AP4035812 S/0020/64/156/001/0067/0068

AUTHOR: Buly*chev, D. K.; Boresnev, B. I.; Gaydukov, M. G.; Marty*nov, Ye. D.; Rodionov, K. P.; Ryabinin, Yu. N.

TITLE: Structural defects and plastic deformation of copper at high pressures

SOURCE: AN SSSR. Doklady*, v. 156, no. 1, 1964, 67-68, and top half of insert facing p. 68

TOPIC TAGS: metal plasticity, structural defect, copper, high pressure metallurgy, self healing, dislocation, vacancy, solid state physics

ABSTRACT: The present paper describes experiments designed for the elucidation of the influence of defects in solids on the increase of plasticity under pressure. The experimental technique is essentially the same as described by I. N. Greenwood and D. R. Miller (Acta Metallurgica, 2, no. 2, 1954, 250. The true deformation $e = \ln(f_0/f)$ where f_0 is the initial cross section of the specimen of copper M2, f - that at rupture, was measured. In addition, the microstructures of samples ruptured under pressure were observed with an optical micro-

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ACCESSION NR: AP4035812

2

scope. It was found that there is, at lower pressures, a considerable difference between the plasticity of defective and defect-free specimens. But at pressures above 4,000 atm this difference disappears. Similar results were obtained by extrusion under high pressure. Apparently, the structural defects which cause rupture tend to disappear during the deformation under high pressure. Orig. art. has:

ASSOCIATION: Institut fiziki zemli im. O. Yu. Shmidta Akademii nauk SSSR (Institute of Earth Physics); Institut fiziki metallov Akademii nauk SSSR (Institute for Physics of Metals)

SUBMITTED: 28Dec63 ENCL: 00 SUB CODE: IC, ME

NO REF SOV: 007 OTHER: 002

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

L 10260-66 EWT(m)/EWP(w)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) IJP(c) JD/HW
ACC NR: AP5026369 SOURCE CODE: UR/0370/65/000/005/0187/0192

AUTHOR: Gaydukov, M. G. (Sverdlovsk); Malyshev, K. A. (Sverdlovsk); Pavlov, V. A. (Sverdlovsk)

ORG: none

TITLE: Effect of phase transformation-induced strain hardening on the heat resistance of iron-nickel alloy

SOURCE: AN SSSR. Izvestiya. Metally, no. 5, 1965, 187-192

TOPIC TAGS: iron alloy, heat resistant alloy, nickel containing alloy, titanium containing alloy, strain hardening, iron base alloy, rupture strength, heat resistance, solid mechanical property

ABSTRACT: Two iron-base alloys containing 1) 0.06% C and 28.9% Ni, and 2) 0.04% C, 1.73% Cr, 24.5% Ni, and 2.32% Ti were tested for the effect of transformation-induced strain hardening on mechanical properties at room and elevated temperatures. Alloy specimens were austenitized at 1200C and quenched in liquid nitrogen and then annealed at 600, 700, and 800C (alloy 1) are at 900 and 1100C (alloy 2). In alloy 1 the maximum effect was produced by annealing at 600 or

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L 10260-66
ACC NR: AP5026369

700C, which increased the yield strength to 41 and 37 kg/mm^2, respectively. Annealing at 800C lowered the yield strength to 13 kg/mm^2 and increased the elongation to 40--46%. In stress-repture tests at 400C, alloy 1 annealed at 700C had a rupture life of 837 or 55 hr under a stress of 36 or 38 kg/mm^2, respectively, while conventionally treated (annealed at 1200C) alloy under a stress of 30 or 32 kg/mm^2 had a rupture life of 68.5 or 1.2 hr, respectively. At 600C the positive effect of strain hardening is maintained for a relatively short period of time, not exceeding 100 hr. The effect of transformation-induced strain hardening on alloy 2 was considerably greater. Alloy 2 annealed (after quenching) at 900C had a 100-hr rupture strength at 700C of 17.5 kg/mm^2, compared to 3.5 kg/mm^2 for alloy 1. Orig. art. has: 4 figures and 2 tables.

SUB CODE: 11/ SUBM DATE: 06May65/ ORIG REF: 016/ OTH REF: 002/ ATD PRESS: 4160

Card 2/2 hw

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

L 26633-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(b) Pf-4 JD/HW
ACCESSION NR: AP5004271 S/0126/65/019/001/0101/0104

AUTHOR: Sokolov, Ye. N.; Gaydukov, M. G.; Petrova, S. N.

TITLE: Specific features of the first stage creep in nimonic-type alloy subjected to high-temperature thermomechanical treatment

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 1, 1965, 101-104

TOPIC TAGS: nimonic alloy, nimonic alloy creep, alloy thermomechanical treatment

ABSTRACT: The effect of high-temperature thermomechanical treatment (HTTMT) on the creep behavior of nimonic-type alloy has been investigated. Alloy specimens were rolled at 1080C with 25—30% reduction, water quenched, and aged at 750C for 16 hr. Creep tests at 500, 550, and 600C under a stress of 70—105 kg/mm^2 showed that the HTTMT considerably affects the alloy creep behavior: it decreases the initial deformation, prolongs the first creep stage, and reduces the creep rate and the total deformation of the first stage (see Fig. 1 of the Enclosure). Such behavior is explained by the decrease in the number of moving dislocations and the formation of a stable substructure. It is assumed that HTTMT has a more pronounced blocking effect on dislocations than the substructure formed in the first creep

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L 26633-65
ACCESSION NR: AP5004271

stage. This may be associated with a localization of the decomposition of solid solution around the dislocations, and also with the formation of dissolved atom clouds around the dislocations. Orig. art. has: 3 figures. [ND]

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Physics of Metals, AN SSSR)

SUBMITTED: 27Jan64 ENCL: 01 SUB CODE: MM

NO REF SOV: 012 OTHER: 008 ATD PRESS: 3188

Card 2/3

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

L 26633-65
ACCESSION NR: AP5004271 ENCLOSURE: 01

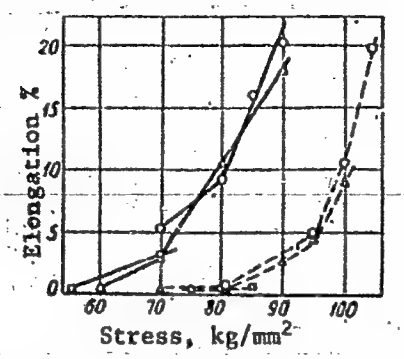

Fig. 1. Creep curves of nimonic-type alloy

—— HTTMT; --- regulat treatment;
o - 500; Δ - 550; □ - 600C.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

ACC NR: AT6034463 (A) SOURCE CODE: UR/0000/66/000/000/0265/0271

AUTHOR: Surkov, Yu. P.; Sadovskiy, V. D.; Sokolkov, Ye. N.; Pavlov, V. A.; Gaydukov, M. G.

ORG: none

TITLE: Effect of high temperature thermomechanical treatment at a small deformation rate on the heat resistance of Type KhN77YuR alloy

SOURCE: AN SSSR. Institut metallurgii. Svoystva i primeneniye zharoprochnykh splavov (Properties and application of heat resistant alloys). Moscow, Izd-vo Nauka, 1966, 265-271

TOPIC TAGS: metal heat treatment, heat resistance, metal deformation, metal recrystallization

ABSTRACT: High temperature thermomechanical treatment, concluding with deformation of the material at increased temperatures, and then cooling, eliminating the development of recrystallization due to the birth and growth of new grains, leads to a considerable improvement in the heat resistance properties of steels and alloys. The present article considers the effect of high temperature thermomechanical treatment at a small deformation rate (0.003-0.004 sec^{-1}) on the heat resistance of alloy KhN77TYuR. Samples with a size of 50 x 50 x 75 mm were heated to a temperature of

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ACC NR: AT6034463

1080° with a holding time of 8 hours, after which part of them were cooled in air (control samples), while the other part was subjected at the same temperature to 25-30% deformation. On the basis of the experimental results, the following conclusions were drawn: 1) high temperature thermomechanical treatment of alloy KhN77TYuR with a deformation rate of 0.003-0.005 sec^{-1} assures a recrystallization structure in a cross section of the order of 50 x 50 mm, and leads to an improvement in heat resistance properties; 2) fragmentation of the structure in the alloy assures greater stability, and increases the temperature of articles made from the alloy by the method of high temperature thermomechanical treatment (up to 850°). Orig. art. has: 3 figures and 1 table.

SUB CODE: 11/ SUBM DATE: 10Jun66/ ORIG REF: 005

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, N.

Defenders of national property. NTO 5 no.10:40-41 O '63.
(MIRA 17:1)

1. Predsedatel' revizionnoy komissii sektsii protivopozharnoy tekhniki Kiyevskogo pravleniya gorodskogo khozyaystva i avtomobil'nogo transporta.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Nikolay Sergeyevich; KIYANICHENKO, N.S., red.

[Fire prevention in residential and public buildings] Pozharnaia bezopasnost' zhilykh i obshchestvennykh zdanii. Kiev, Budivel'nyk, 1965. 179 p. (MIRA 18:8)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, S. (Voronezh)

Propaganda is animated, creative work. Za rul 17 no.3:6-7 Mr '59. (MIRA 12:5)

1.Zamestitel' predsedatelya obkoma Dobrovol'nogo obshchestva sodeystviya armii, aviatsii i flotu.
(Automobiles--Societies, etc.)
(Automobile drivers)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, V.I.

New method of roof control. Ugol' Ukr. 5 no.1:32-34 Ja '61.
(MIRA 14:1)

(Mine timbering)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

IL'SHTEYN, A.M.; GAYDUKOV, V.I.; ZAKUTSKIY, I.A.

Rock pressure control in longwalls of flat and inclined seams with roof caving on the stope lining. Ugol' 36 no.12:27-31 D '61. (MIRA 14:12)

(Rock pressure)
(Mine timbering)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, V.I.; IL'SHTEYN, A.M.; FETISOV, M.S.

Studying rock pressure in mines of the Moscow Basin. Fiz.-mekh.-svois.,dav.i razr.gor.porod no.1:61-85 '62. (MIRA 16:3)
(Moscow Basin--Rock pressure)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, V.I., gornyy inzh.; ZHELTONOZHKO, Yu.V., gornyy inzh.

Performance of the SU angular props. Ugol' Ukr. 6 no.8:31 Ag '62. (MIRA 15:11)
(Mine timbering)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

ACC NR: AP7005520 (A) SOURCE CODE: UR/0342/66/000/011/0072/0072

AUTHOR: Volodina, L. A. (Docent); Gaydukov, V. I. (Aspirant); Yavorskiy, B. M. (Professor)

ORG: [Volodina; Gaydukov] MTI

TITLE: Applying neutral light filters to improve precise measurement of reflection coefficients for dyed fabrics

SOURCE: Tekstil'naya promyshlennost', no. 11, 1966, 72

TOPIC TAGS: light reflection coefficient, transmission coefficient, glass optic property, spectrophotometer, textile, optic filter / SF-10 spectrophotometer, NS-6 filter, NS-7 filter, NS-9 filter

ABSTRACT: In measuring reflection coefficients by spectrophotometer or photometer, a glass neutral filter placed in the path of the calibrating beam will increase the reflection coefficient by $\frac{1}{T_\lambda}$ (T_λ is the transmission coefficient). The true values of the reflection coefficients in this case will be $R_{\lambda\ true} = R_{\lambda\ meas}\ T_\lambda$, where $R_{\lambda\ meas}$ is the value of the reflection coefficients with the introduction of the light filter. Such a filter was used in an SF-10 spectrophotometer with polarized light in examining dyed fabrics, and was found to double the minimum and maximum

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ACC NR: AP7005520

reflection coefficients, probably due to the relation of dye molecules to fiber axes in the fabric. A table gives percentages of error in determining reflection coefficients by three filters NS-6, NS-7 and NS-9. Orig. art. has: 3 formulas, 1 table, and 1 figure.

SUB CODE: 11, 14,20/ SUBM DATE: none

Card 2/2

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

IL'SHTEYN, Aleksandr Mikhaylovich, kand. tekhn. nauk; GAYDUKOV, Viktor Ivanovich; ZAKUTSKIY, Igor' Aleksandrovich; VORONKOV, A.K., otv. red.

[Settling of the roof without battery stulls in longwalls of flat seams]Bezorgannaia posadka krovli v lavakh pologikh plastov. Moskva, TSentr. in-t tekhn. informatsii ugol'noi promyshl., 1962. 51 p. (MIRA 17:7)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

BYSTROV, N.M., otv.red.; KUZNETSOV, N.A., red.; KRUPA, G.D., red.; LIKHACHEV, I.I., red.; GAYDUKOV, V.M., red.; IVANCHIKHIN, A.Ya., red.; OVCHAROVA, N.G., red.; NOVOSPASSKIY, K.M., red.; AVDYUSHIN, I.D., tekhn.red.

[For the Soviet regime; articles, sketches, and reminiscences devoted to the 40th anniversary of the Soviet regime in Belgorod Province] Za vlast' sovetov; stat'i, ocherki, vospominaniia posviashchennye 40-letiiu Sovetskoi vlasti v Belgorodskoi oblasti. Belgorod, Kurskoe knizhnoe izd-vo, 1957. 232 p. (MIRA 13:8)
(Belgorod Province)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, V. P.

N/5
664.4
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Eksploatatsionnyye mashiny i mekhanizmy v neftyanoy promyshlennosti (Operation of machines and mechanisms in the petroleum industry) Moskva, Gostoptekhizdat, 1945.
438 P. Diagrs., tables.
"Spisok literatury" P. 432(433)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, V. P.

Hydraulics. State Technical Press, Moscow-Leningrad: 1946. 300 pp.
(Meteorologiya i Gidrologiya, No 6 Nov/Dec 1947)

SO: U-3218, 3 Apr 1953

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

KOZLOV, V.S.; KUZNETSOV, G.I.; GAYDUKOV, V.P., redaktor; LUKINOVA, Ye.G., redaktor; MASOLOV, Ya.M., tekhnicheskiy redaktor.

[Deep well pump operation practice of the State Association of Azerbaijan Oil Industry] Osvoenie i ekspluatatsiia glubokikh skvashin nasosnym sposobom; opyt Aznefti. Moskva, Gos.nauchno-tekhn.izd-vo neftianoi i gorno-toplivnoi lit-ry, 1954. 31 p. (MIRA 8:4)
(Oil well pumps)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Vasiliy Petrovich; MOLOSTOV, V.S., inzh., prepodavatel', retsenzent; MURAV'YEV, V.M., inzh., retsenzent; PETROVA, Ye.A., vedushchiy red.; FEDOTOVA, I.G., tekhn.red.

[Technical calculations in petroleum production] Tekhnicheskie raschety pri ekspluatatsii neftianykh skvazhin. Moskva, Gos. nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry, 1961. 271 p. (MIRA 14:4)

1. Groznenskiy neftyanoy tekhnikum (for Murav'yev).
(Oil reservoir engineering)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

MISHCHENKO, N.M.; BELEVTSOV, G.A.; ROTMISTROVSKIY, B.M.; IVANENKO, A.Ya.; KONOVALOV, S.I.; MYTSENKO, D.I.; ANDREYEV, A.A.; GAYDUKOV, V.S.

Complex automation of blast furnace air preheaters. Stal' 23 no.6:497-499 Je '63. (MIRA 16:10)

1. Yenakiyevskiy metallurgicheskiy zavod.

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, V.V.

Over-all mechanization of the production of test tubes. Stek. i ker. 18 no.11:35-37 N '61. (MIRA 15:3)
(Glass blowing and working)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Yu.; MIKHAYLINA, A.; TOLSTYKH, A.

Improve the interpretation of problems in increasing labor productivity in industry; a review of the literature in 1955. Vop.ekon. no.4:139-146 Ap '56. (MLRA 9:8)
(Efficiency, Industrial)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

25(5) PHASE I BOOK EXPLOITATION SOV/2581

Veselkov, F. S., Yu. A. Gaydukov, S. Ye. Kamenitser, (Chief), V. G. Kontorovich, G. A. Pishchulin, A.M. Savkin, A.S. Tolstykh, and A.S. Fastovskiy

Ravnomernaya rabota mashinostroitel'nykh zavodov (Uniform Work of Machine-Manufacturing Plants) Moscow, Mashgiz, 1958. 171 p. Errata slip inserted. 4,000 copies printed.

Reviewer: A. K. Bondarenko, Engineer; Ed.: V. A. Letenko, Candidate of Economic Sciences; Tech. Ed.: V. D. El'kind; Managing Ed. for Literature on the Economics and Organization of Production (Mashgiz): T. D. Saksaganskiy.

PURPOSE: This book is intended for engineering and technical personnel in machine-manufacturing plants

COVERAGE: This book discusses the national economic importance of uniform operation of plants according to a schedule, and points out planning problems that should be solved to permit work uniformity in manufacturing establishments. It defines organizational and technical prerequisites for uniform work, shows the in-

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fluence of financial agencies of establishments on production uniformity, and describes methods of measuring work uniformity. The last two chapters are devoted to work practices at the Moscow "Elektroschetchik" Plant and the Pervyy Moskovskiy chasovoy zavod (First Moscow Watch and Clock Plant). No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

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Uniform Work of Machine (Cont.)

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APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Yuriy Aleksandrovich, kand. ekonom. nauk; KUZNETSOV, P.V., red.; GERASIMOVA, Ye.S., tekhn. red.

[Analyzing the fulfillment of the production program and technological development plan of an enterprise] Analiz vypolneniia proizvodstvennoi programmy i plana tekhnicheskogo razvitiia predpriiatiia. Moskva, Izd-vo ekon. lit-ry, 1961. 55 p. (MIRA 15:2)
(Moscow—Industrial management) (Accounting)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

BIRMAN, A.M.; GAYDUKOV, Yu.A.; GOLUBTSOV, L.B.; ITIN, L.I.; KAMENITSER, S.Ye.; MIRONOV, I.N.; TOLSTYKH A.S.; SHIRANSKIY, V.P.; SHUVALOV, N.M.; AVETISYAN, Ye., red.; MUKHIN, Yu., tekhn. red.

[School of socialist management; book for reading in schools for workers studying the economics of industrial enterprises] Shkola sotsialisticheskogo khoziaistvovaniia; kniga dlia chteniia v shkolakh rabochikh izuchaiushchikh ekonomiku promyshlennykh predpriiatii. Moskva, Gospolitizdat, 1962. 295 p. (MIRA 15:9)

(Industrial management)

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3"

"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

YEFIMOV, A.N., glav. red.; BACHURIN, A.V., red.; VOLODARSKIY, L.M., red.; GERSHBERG, S.R., red.; GINZBURG, S.Z., red.; DUNDUKOV, G.F., red.; KIRZHNER, D.M., red.; KLIMENKO, K.I., red.; KOMAROV, F.V., red.; KOROL'KOV, A.N., red.; KUYLOV, P.N., red.; LIVANSKAYA, F.V., red.; LOKSHIN, E.Yu., red.; OSTROVITYANOV, K.V., red.; POSVYANSKIY, S.S., red.; PRUDENSKIY, G.A., red.; RAZUMOV, N.A., red.; RUMYANTSEV, A.F., red.; TATUR, S.K., red.; SHUKHGAL'TER, L.Ya., red.; BAZAROVA, G.V., starshiy nauchnyy red., kand. ekon. nauk; KISEL'MAN, S.M., starshiy nauchnyy red.; GLAGOLEV, V.S., nauchnyy red.; TUMANOVA, N.L., nauchnyy red.; BLAGODARSKAYA, Ye.V., mlad. red.; SHUSTROVA, V.M., mladshiyy red.; GAYDUKOV, Yu.A., kand. ekon. nauk, red.; ZBARSKIY, M.I., red.; LOZOVOY, Ya.D., red.; SERGEYEV, A.V., dots., red.; KHEYFETS, L.M., kand. tekhn. nauk, red.; LYUBOVICH, Yu.O., kand. ekon. nauk, red.; SYSOYEV, P.V., red.; KOSTI, S.D., tekhn. red.

[Economic encyclopedia; industry and construction]Ekonomicheskaia entsiklopediia; promyshlennost' i stroitel'stvo. Chleny red. kollegii: A.V.Bachurin i dr. Moskva, Gos.nauchn. izd-vo "Sovetskaia entsiklopediia." Vol.1. A - M. 1962. 951 p. (MIRA 15:10)

(Russia--Industries--Dictionaries)
(Construction industry--Dictionaries)

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Yu.I.

Using auger-core tools in the prospecting of titanium-zirconium placers. Razved. i okh. nedr. 30 no.5:26-27 My '64. (MIRA 17:10)

1. Volgo-Donskoye geologicheskoye upravleniye.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Yu. P.

USSR.

2320

INVESTIGATION OF BISMUTH ALLOYS AT VERY LOW TEMPERATURES. N. E. Alekseevskiĭ and Yu. P. Gaĭdukov. Zhur. Eksptl'. i Teoret. Fiz. 25, No. 3, 383-4(1963). (In Russian)

It was found experimentally that the intermetallic compound Bi_2Pt displays superconductivity. The $H_c(T)$ relationship is expressed by the formula $H_c/H_0 + (T/T_c)^2 = 1$, where $H_0 = 9.5$ Oe and $T_c = 0.155°K$, which is so far the lowest recorded superconductivity transition temperature. The BiPt alloys gave uncertain results, and the measurements must be repeated. Bi_2S_3 did not display superconductivity down to 0.1°K; Bi_4Rh displayed superconductivity only in hardened state. (Science Abstracts)

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USSR/Physics - Superconductivity versus pressure FD-3280

Card 1/2 Pub. 146 - 39/44

Author : Alekseyevskiy, N. Ye.; Gaydukov, Yu. P.

Title : Influence of pressure upon the superconducting properties of cadmium

Periodical : Zhur. eksp. i teor. fiz., 29, No 6(12), Dec 1955, 898-899

Abstract : The influence of pressure upon the displacement of the critical temperature of superconductors has been investigated by many authors (e.g. N. Ye. Alekseyevskiy ibid., 10, 1940; B. G. Lazarev and L. S. Kan, ibid., 14, 1944; N. Ye. Alekseyevskiy and N. B. Brandt, ibid., 22, 1952; L. S. Kan, B. G. Lazarev and A. I. Sudovtsev, ibid., 18, 1948), but only superconductors whose temperatures of transition lie above 1°K. Among superconductors with lower transitional temperatures is cadmium, which passes over into the superconducting state at 0.54°K. The authors measured the dependence of the critical magnetic field upon temperature in specimens of polycrystalline cadmium without pressure and under pressure, the results of which experiment are given here. For obtaining temperatures in the interfal 0.06-0.60°K they used the method of adiabatic demagnetization of a paramagnetic salt; pressure was created by freezing of water in a constant-volume bomb (B. G. Lazarev and L. S. Kan, ibid., 14, 1944). They conclude that the relative change in T_k created by pressure of 1500 atm amounts to 8.3% exceeding by several times corresponding values for other superconductors than Cd. Ten references.

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GAYDUKOV, Yu.P.

Effect of pressure on the superconducting properties of cadmium. V. E. Alekseevskii and Yu. P. Gaidukov. [illegible] 2, 782 (1956) (English tr.) [illegible]

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Yu. P.

Galvanomagnetic properties of gold. N. B. Alekseevskiĭ and Yu. P. Gaĭdukov. *Zhur. Eksptl. i Teoret. Fiz.* 31, 947–50(1956).—The elec. resistance of Au, with or without magnetic field, was measured at 0.05–20.4°K. Four samples of Au 99.99–99.999% pure (balance Fe) were investigated. Three samples had an anomalous rise of cond. at low temps. to a satn. value r_s. $\Delta r = (r_s - r_{min.})/r_{min.} = 0$ for $H = 8$ kiloöersted. The anomalous behavior is attributed to small amts. of impurities, probably of atoms with incomplete d shells. S. Paksweer

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56-6-54/56

AUTHOR: ALEKSEYEVSKIY, N.Ye., GAYDUKOV, Yu.P.

TITLE: The Hall Effect and the Susceptibility of Gold. (Effekt Kholla i vospriimchivost' zolota, Russian)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 6, pp 1589 - 1591 (U.S.S.R.)

ABSTRACT: The following experimental results were obtained: The dependence r(T) for the gold sample Au-1 shows $T_{min} \approx 4^{\circ}K$. The increase of r takes place proportional to ln(1/T), where $\Delta r/r_{min}$ at $T = 0{,}07^{\circ}K$ amounted to about 15 %. The measurement $\Delta r = r_{0{,}07^{\circ}K} - r_{min}$ in dependence on the magnetic field furnished the value $\approx 8{,}5$ kOe for H_k.

The gold sample Au-4 shows no irregularities. In the temperature range of from $295^{\circ}K$ to $1{,}45^{\circ}K$ the magnetic susceptibility of gold of the class Au-1 remains diamagnetic, where its value at $1{,}45^{\circ}K$ amounts to 70% of the value at $295^{\circ}K$.

ASSOCIATION: Institute for Physical Problems of the Academy of Science of the U.S.S.R.

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

AUTHOR: Gaydukov, Yu. P. 56-34-4-8/60

TITLE: The Temperature Anomaly of the Resistance and the Hall Effect in Gold (Temperaturnaya anomaliya soprotivleniya i effekt Kholla u zolota)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 34, Nr 4, pp. 836-842 (USSR)

ABSTRACT: The author investigates the Hall effect [illegible] the temperature and on the magnetic field strength in samples of gold with normal and anomalous temperature dependence of the resistance. For the production of the samples two sorts of gold of Soviet origin were used, their composition ascertained by spectrum analysis is given in a table. The degree of purity of these gold samples is 99%. The measurement of the Hall effect was made at room temperature, at the temperatures of liquid nitrogen, hydrogen, and helium, and also at extremely low temperatures, which were produced by adiabatic demagnetisation of iron-ammonium-alum. The construction of the device for the production of the extremely low temperatures was already previously described by the authors (Ref 5). The relative error of the measurements was kept below 1%. The resistance of the

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sample Au-1 increased considerably at a temperature drop, the increase of the resistance of the sample Au-4, however, remained equal in the temperature range 4,2 - 1,4° K within the limits of measuring errors. In Au-1 the temperature minimum becomes zero at a field strength H = (8 ± 0,5).10³ Oersted. The intensity of the Hall effect as a function of the magnetic field strength was measured at the temperatures 295,77; 20,4; 10,1; 4,2 and 0,07° K. The corresponding results are visualized in 2 diagrams. A further diagram visualizes the Hall constants for Au-1. In the gold samples with anomalies in the curve r(T) also an anomaly of the Hall effect is observed. At the end a short report is given concerning results by other authors dealing with the same subject. There are 6 figures, 2 tables, and 10 references, 4 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute for the Study of Problems in Physics, AS USSR)

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SOV/56-35-2-58/60

24(2)

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P.

TITLE: The Anisotropy of the Electric Resistance of a Gold Monocrystal in a Magnetic Field at 4,2°K (Anizotropiya elektricheskogo soprotivleniya monokristalla zolota v magnitnom pole pri 4,2°K)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 2(8), pp 554-555 (USSR)

ABSTRACT: The results of many papers concerning the investigation of the galvanomagnetic properties of monovalent metals do not agree with the theory. It is interesting, therefore, to investigate the character of the variation of the resistance of these metals in a magnetic field. These investigations are carried out for various crystallographic directions. A gold monocrystal is the most useful material for this purpose. Such a monocrystal (height 30 mm and 0,3 mm, purity 99,9999 %) was prepared. The resistance was varied by 1650 times when the temperature decreased from the laboratory temperature to 4,2°K. A polar diagram was obtained for this gold monocrystal in a magnetic field of H = 23 kOe at T = 4,2°K. The rotation

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The Anisotropy of the Electric Resistance of a Gold Monocrystal in a Magnetic Field at 4,2°K

axis of the magnetic field was parallel to the axis of the gold monocrystal. The dependence of the ratio $\Delta r_H/r_o = (r_H - r_o)/r_o$ on magnetic field strength was obtained in the direction of the highest maximum and of the lowest minimum of the polar diagram. r_H and r_o denote the values of the resistance in the magnetic field and without a magnetic field. The results of these measurements are shown in 2 figures. In the direction of the maximum an unlimited increase of the resistance ($\Delta r_H/r_o \sim H^{1,8}$) is observed, but in the direction of the minimum the resistance is totally saturated ($\Delta r_H/r_o \sim 1$), if $H \gg H_o$. H_o may be derived from the equation $1/R = 1$ and in the investigated case it is equal to 1,4 kOe. l denotes the free length of path and R the curvature of the trajectory of the motion of the conduction electrons in the magnetic field. Analogous results were found for all the maxima and minima of the polar diagram. From the results of this paper the following conclusions may be drawn:

Card 2/3 The linear increase of the resistance of polycrystalline

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The Anisotropy of the Electric Resistance of a Gold Monocrystal in a Magnetic Field at 4,2° K

specimens (which was found by Kapitsa) is caused by the averaging of various ratios $\Delta r_H/r_o$ with respect to the angles. The author thanks P. L. Kapitsa, Member, Academy of Sciences, USSR, for the discussion of these results. There are 2 figures and 7 references, 3 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems, AS USSR)

SUBMITTED: June 14, 1958

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

18(6)

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P. SOV/56-35-3-47/61

TITLE: The Influence Exercised by a Plastic Deformation Upon the Anomalous Behavior of the Resistance of Gold at Low Temperatures (Vliyaniye plasticheskoy deformatsii na anomal'noye povedeniye soprotivleniya zolota pri nizkikh temperaturakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 35, Nr 3, pp 804 - 806 (USSR)

ABSTRACT: First, two earlier papers dealing with this subject are referred to in short. For the purpose of investigating the influence exercised upon the minimum resistance of gold more accurately, the authors carried out an experimental investigation of the influence exercised by elastic and plastic deformations on the depth of the minimum and on the value of the "critical" field strength H_c. Compression occurred from all sides by allowing water to freeze in a bomb made of beryllium bronze. In the case of such a compression from all sides the depth of the minimum is reduced only a little and also the specific resistance changes only very slightly. The influence exercised by

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The Influence Exercised by a Plastic Deformation Upon the Anomalous Behavior of the Resistance of Gold at Low Temperatures

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plastic deformation on the course of the resistance curves was investigated in two series of tests. In the course of the first series of tests, the deformation of the sample was investigated at the temperature of liquid helium by means of a special press. The deformations obtained at the temperature of liquid helium were comparatively small. The influence exercised by greater deformations was investigated on wires which were deformed at room temperature by means of a hydraulic press. The result obtained by these measurements are shown by diagrams. According to all results obtained in the present case, the depth of the minimum and the "critical" field strength depend to a considerable extent on the deformation. With a certain value of deformation, the depth of the minimum becomes equal to zero, and the critical field-strength tends towards infinity. A comparison of all results obtained results in the following: The occurrence of the minimum of resistance is caused by the scattering of conductive electrons on the impurities of certain elements. The authors thank P. L. Kapitsa for discussing the results obtained. There

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The Influence Exercised by a Plastic Deformation Upon the Anomalous Behavior of the Resistance of Gold at Low Temperatures

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are 3 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute for Physical Problems of the Academy of Sciences, USSR)

SUBMITTED: June 14, 1958

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GAYDUKOV, Yu. P.

24(0) SOV/30-59-2-42/60

AUTHOR: Khalatnikov, I. M., Doctor of Physical and Mathematical Sciences

TITLE: Investigations of Low-temperature Physics (Issledovaniya po fizike nizkikh temperatur)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 2, pp 98-100 (USSR)

ABSTRACT: The 5th All-Union Conference on this problem took place in Tbilisi from October 27 to November 1, 1958. It was attended by physicists from Moscow, Khar'kov, Leningrad, Tbilisi, Sverdlovsk, and Kiyev. 4 fields of low-temperature physics were discussed: superliquidity of liquid helium II, supraconductivity, antiferromagnetism, magneto-resistive effect. The following reports and communications were heard: A. A. Abrikosov, L. P. Gor'kov reported on the investigation of the properties of supraconductive alloys. A. A. Abrikosov, L. P. Gor'kov, I. M. Khalatnikov spoke of properties of supraconductors in the high-frequency magnetic field. D. V. Shirkov and Chen' Chun'-yan' and Chzhou Si-shin', two young Chinese scientists working at Moscow University, described investigations for determination of the influence exercised by the Coulomb (Kulon) interaction of charges on supraconductivity. V. V. Tolmachev explained the

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nature of the so-called collective excitations of the Bose type in supraconductors. D. N. Zubarev, Yu. A. Tserkovnikov spoke of the thermodynamics of supraconductors and B. T. Geylikman, V. Z. Kresin of the thermal conduction of supraconductors. Yu. V. Sharvin, V. F. Gantmakher reported on experimental work with supraconductors. N. V. Zavaritskiy spoke of the measurement of the anisotropy of thermal conductivity in the supraconductive state. In a series of reports problems of the superliquidity of helium were discussed, which was discovered in 1938 by P. L. Kapitsa and the theory of which was set up in 1941 by L. D. Landau. E. L. Andronikashvili and his collaborators investigated the properties of rotating helium. V. P. Peshkov spoke of the effect of the formation of the boundary between superliquid and non superliquid helium. Guan Vey-yan', collaborator of the Institut fizicheskikh problem (Institute of Physical Problems) investigated the properties of the so-called jump in temperature of Kapitsa. I. M. Lifshits, V. G. Peschanskiy investigated galvanomagnetic phenomena in strong magnetic fields for metals with open Fermi surfaces. N. Ye. Alekseyevskiy, Yu. P. Gaydukov experimentally investigated the resistance anisotropy of gold monocrystals in the

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magnetic field. L. S. Kan, B. G. Lazarev combine the presence of a temperature minimum with the structural state of the metal. M. Ye. Azbel' reported on the quantum theory of metallic conductivity in the alternating electromagnetic and constant magnetic field. A. S. Borovik-Romanov reported on the weak ferromagnetism in antiferromagnetic samples of $MnCO_3$. N. M. Kreynes, Ye. A. Turov investigated the magnetic anisotropy of the antiferromagnetic monocrystals $CuSO_4$ and $CoSO_4$. R. A. Alikhanov reported on neutronographic investigations of antiferromagnetics. Ye. I. Kondorskiy and collaborators reported on the susceptibility of nickel and nickel-copper alloys at low temperatures. M. I. Kaganov, V. M. Tsukernik reported on kinetic phenomena in ferromagnetics at low temperatures. A. I. Akhiyezer, V. G. Bar'yakhtar, and S. P. Peletminskiy spoke of computations of the relaxation of the magnetic moment in ferromagnetic dielectrics at low temperatures. T. I. Sanadze spoke of observation results of paramagnetic resonance of terbium in the $TbNO_3 \cdot 6H_2O$ nitrate. G. R. Khutsishvili gave a theoretical analysis of the orientation of the nuclear spin in the Overhauser (Overkhauser)

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effect in nonmetals. B. S. Samoylov, S. M. Reynov and collaborators reported on obtaining orientated nuclei. N. P. Bulatova, V. S. Kogan and B. G. Lazarev showed that hydrogen isotopes in solid state have different structures. I. A. Gindin, B. G. Lazarev, Kh. D. Starodubov and V. I. Khotkevich detected polymorphism in a number of metals at low temperatures. E. L. Andronikashvili, V. P. Peshkov and M. P. Malkov reported on the stage of development of foreign scientific research work in the field of low-temperature physics. At the end of the Conference P. L. Kapitsa spoke of his successful development of investigations in the field of low-temperature physics. The participants of the Conference visited the Institut fiziki Akademii nauk Gruzinskoy SSR (Physics Institute of the Academy of Sciences of the Gruzinskaya SSR) and the Physics Faculty of Tbilisi University as well as the building of the new research atomic reactor near Tbilisi.

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24(3)
AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P. SOV/56-36-2-15/63

TITLE: Measurement of the Electric Conductivity of Metals in a Magnetic Field as a Method of Investigating the Fermi Surface (Izmereniye elektroprovodnosti metallov v magnitnom pole kak metod issledovaniya poverkhnosti Fermi)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 2, pp 447-450 (USSR)

ABSTRACT: Lifshits, Azbel', Kaganov (Ref 1) as well as Chambers (Chembers) (Ref 2) showed that isoenergetic surfaces of conductivity electrons in metals can be represented by topologically composed surfaces with open cross sections. The Fermi surface can be built up from data obtained by measurement of the de Haas-van Alphen (de Gaaz, van Al'fen) effect, of the anomalous skin effect, or of cyclotron resonance (Ref 3). However, these measurements did not produce unique results near open cross sections. The present paper intends to investigate the anisotropy of electric resistance in a magnetic field in various (Sn, Pb, Tl, Ga, Na) single crystals in connection with the existence of open Fermi surfaces. As already shown (Ref 1), a quadratic increase of resistance is to be expected in open Fermi

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surfaces for one field direction, whereas for another field direction saturation sets in. In a previous paper (Ref 4) the authors already investigated the variation of resistance in gold and copper in dependence on the angle formed by the magnetic field $\vec{H}$ and the crystallographic axes, and they showed that for the course $\Delta r_H/r_o$ partly a quadratic increase and partly saturation occurs, according to the direction of $\vec{H}$. Now, the angular dependences of r(H) for other metallic single crystals are investigated at 2.4 and 1.5°K. The data characterizing the samples are given in a table. The polar diagrams measured for H = const on a Sn-, Pb-, and Tl-sample are shown by figure 1 (H = 23 kOe, 22.3 kOe and T = 4.2°K). $\vec{H}$ was in all cases vertical to the measured current $\vec{J}$. These diagrams show that also in these crystals it is true that with a variation of the angle between the field and the crystallographic axes the law of increase of the resistance in the magnetic field changes from a quadratic form to that of saturation (Fig 2). Anisotropy was found to be especially high in tellurium and gallium.

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A theoretical explanation of these phenomena is given by the paper by Lifshits and Peschanskiy (Ref 6).
The authors finally thank Academician P. L. Kapitsa for his constant interest in this work. There are 2 figures, 1 table, and 9 references, 5 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute for Physical Problems of the Academy of Sciences, USSR)

SUBMITTED: October 21, 1958

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24(3)
AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P. SOV/56-37-3-14/62

TITLE: The Anisotropy of the Electric Conductivity in the Magnetic Field and the Topology of Fermi Surfaces of Metals

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 3(9), pp 672-677 (USSR)

ABSTRACT: The present paper gives some results of the investigation of the anisotropy of the change of resistance in the magnetic field of monocrystals of Au, Cu, Sn, Pb, Tl, and Ga (which have been investigated already previously (cf. Ref 1)) as well as of Ag, which was investigated for the first time. Most of the metals were investigated on 10 to 15 samples which each showed different orientation of the crystal axes (Determination of the orientation was carried out by G. E. Karstens). The purity of the samples was characterized by the resistance ratio $\rho(300^\circ)/\rho(4.2^\circ)$; it amounted to 10 000 for Sn, Pb, and Ga, to 3000 for Tl, and for Au, Cu, and Ag it was of the order of magnitude 1 000. All measurements were carried out at 4.2°K. The samples were rotated in the constant magnetic field and the angular dependence of the resistance was measured. Figures 1-4 show this dependence for differently

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oriented Cu, Ag, Pb, and Ga-samples at H = 23.5KOe. The orientation (in figures 1,2, which show the angular dependence of the relative change of resistance) and the degree of purity are given. An investigation of the anisotropy of the resistance of silver showed that the resistance in the direction of the minimum (in the rotation diagram) attains a saturation value and that with H it increases exponentially (nearly quadratically) in the direction of the maximum (Fig 5). Similar conditions prevail also in the case of other metals. It is further found that the average relative resistance depends linearly upon H (Fig 6) (Law of Kapitsa). The connection of the half-width of the narrow maxima and minima for Au, Cu, Pb, and Sn in the rotational diagram was investigated. It was found that the half-width of the maxima decreases with increasing H (e.g. like 1/H), and that of the minima at the same time remains constant, which agrees well with the theory (Fig 7, Ref 4). Further investigations were made about the variation of the depth of the minimum in the case of fixed H-direction and varying current direction. Figure 8 shows the result for four different Sn-samples. A stereo-

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graphical projection of special field directions may be carried out from the various data; - an example (for silver) is shown by figure 9. An analysis of the stereographic projections can be carried out by comparing the results obtained by Lifshits and Peschanskiy. Such an analysis may supply information about the shape of the Fermi surface. All data obtained indicate that, contrary to previous opinions, most metals possess closed Fermi surfaces. In conclusion, the authors thank P. L. Kapitsa for his interest in this work and Professor I. M. Lifshits and V. G. Peschanskiy for discussions. There are 9 figures and 12 references, 8 of which are Soviet.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems of the Academy of Sciences, USSR)

SUBMITTED: April 24, 1959

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24,7700 (1043, 1145, 1160)

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P.

TITLE: The Anisotropy of the Electrical Resistance of Mg and Pt Single Crystals in a Magnetic Field at 4.2°K

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 38, No. 6, pp. 1720-1722

TEXT: It was shown in Refs. 5 and 6 that the electrical resistance of polycrystalline Mg and Pt specimens in a magnetic field increases without any limit. Therefore, the Fermi surface of these metals is either closed (number of electrons equal to the number of holes) or open. In the first case, the resistance must be practically isotropic in large magnetic fields, and in the second case, strongly anisotropic. The present work was undertaken to clarify this problem for single crystals, the galvanomagnetic properties of polycrystals of Mg and Pt having been studied already. The Mg specimens had a $\rho_{300°K}/\rho_{4.2°K}$ ratio of 230 - 610; for Pt, this ratio was between 1900 and 2400. The results of measurement are

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The Anisotropy of the Electrical Resistance of Mg and Pt Single Crystals in a Magnetic Field at 4.2°K

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B006/B070

shown in diagrams. Fig. 1 shows the polar diagram of the resistance of the Mg single crystal specimen, Fig. 3 that of Pt. Figs. 2 and 4 show the resistance of the specimens of Mg and Pt, respectively, as a function of H, each for two different angles. The fact that for some definite angles the relative change of resistance shows saturation and for others an exponential increase indicates that Mg and Pt have open Fermi surfaces. It may be assumed that Mg, like Tl, has a Fermi surface of the type of a "corrugated" plane, and Pt has one like a "spatial cylinder net". Academician P. L. Kapitsa is thanked for his great interest, and G. E. Karstens for help in the determination of the orientation of the crystals. Ye. S. Borovik and V. G. Volotskaya are mentioned. There are 4 figures and 7 Soviet references.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute for Physical Problems of the Academy of Sciences USSR)

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B029/B077

24.7700 (1043, 1143, 1557)

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P., Lifshits, I. M., Peschanskiy, V. G.

TITLE: The Fermi Surface of Tin

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 5(11), pp. 1201 - 1214

TEXT: The author starts by analyzing the geometrical conditions of the Fermi surface for tetragonal crystals. The following expression is used for the dispersion law $\varepsilon(\vec{p})$:

$$\varepsilon(\vec{p}) = A_0 - A_1 \cos\frac{cp_z}{\hbar} - A_2 \cos\frac{cp_z}{2\hbar}\left(\cos\frac{ap_x}{2\hbar} + \cos\frac{ap_y}{2\hbar}\right)$$

$$- A_3 \cos\frac{ap_x}{2\hbar}\cos\frac{ap_y}{2\hbar} - A_4\left(\cos\frac{ap_x}{\hbar} + \cos\frac{ap_y}{\hbar}\right).$$

c denotes the lattice constant along the tetragonal axis [001], and a is the lattice constant

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The Fermi Surface of Tin

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along the binary axes [100] and [010]. Detailed statements are supplemented by illustrating the transformation in stereographic projections along the direction of the magnetic field. The second part of this paper deals with determining the directions of plane sections of an open Fermi surface. There are several types of current diagrams with $\varrho_{\vec{H}} = \text{const}(\alpha)$, where α denotes the angle formed by the current and the open cross section or a certain crystallographic axis ($\vec{j} \perp \vec{H}$). Using these polar diagrams of the current intensity it is possible to determine whether the cause of the quadratic increase of resistance for a given direction of the magnetic field is the compensation of volumes ($V_1 = V_2$) or the presence of open trajectories, and it is possible to determine the direction of these trajectories. Two special cases are then investigated. The experimental results are given and discussed in the third part of this paper. Tin was produced by zone melting at the tekhnologicheskiy otdel IFP AN SSSR (Institute of Physical Problems of the AS USSR, Department of Technology). The resistance diagrams of all tin specimens whose axes enclose a small angle with the axis [001] ($0^\circ < \vartheta' \lesssim 30^\circ$) have the form of eight-leafed rosettes. If this angle

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is increased, new and very small minima will appear; for these minima no saturation of resistance in the magnetic field was observed either. The polar diagrams for the case $\vartheta' \gtrsim 50^{\circ}$ are two-leafed rosettes. Further details are given. A single Fermi surface cannot explain the current diagrams of the type III. (Such a diagram is obtained by employing the method of volume compensation, $V_1 = V_2$). Tin has also other isoenergetic surfaces, which make it possible to explain such a compensation of volumes. At least two sections of the energy spectrum $\varepsilon(\vec{p})$ are essential to the Fermi surface of tin. The second isoenergetic surface can be closed or open. The two variants of the Fermi surface of tin can be made to agree with the stereographic projection along the main directions of the magnetic field. The open surface represents holes, and the closed one, electrons. The shape of the tubes (the connecting parts between the planes) is very similar to a cylinder. A quadratic increase of resistance is predominant for tin in a magnetic field. The one-leafed characteristic of the Fermi surface could be used to explain the specific features of the galvomagnetic properties of lead, cadmium, zinc, and other metals with open Fermi surfaces.

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The Fermi Surface of Tin

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Academician P. L. Kapitsa is thanked for his interest. There are 6 figures, 3 tables, and 6 Soviet references.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems, Academy of Sciences USSR)

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ALEKSEYEVSKIY, N.Ye.; GAYDUKOV, Yu.P.

Fermi surfaces for tin. Zhur.eksp.i teor.fiz. 41 no.4:1079-1081 O '61. (MIRA 14:10)

1. Institut fizicheskikh problem AN SSSR.
(Fermi surfaces)
(Tin)

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

S/056/62/042/001/011/048
B104/B102

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P.

TITLE: The Fermi surface of silver

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, Ja 1962, 69-74 (MIRA 15:3)

TEXT: Silver single crystals (~30 mm long, ~2 mm in diameter) were grown by the Obreimov-Shubnikov method. The following ratio was found between their resistivities at 300 and 4.2°K: $\varrho_{300}/\varrho_{4.2} \approx 1000$. Using a potentiometer circuit with a photoelectric amplifier, the Hall e.m.f. was determined at 4.2°K in magnetic fields of up to 24 koe, which were rotated in a plane perpendicular to the specimen axis. At a constant magnetic field of 23.5 koe, the resistivity of the specimens was determined as a function of the angle between the magnetic field and the crystallographic axes. Both the resistivity of the single crystals and the angular dependence of the Hall e.m.f. are strongly anisotropic. The maxima of the Hall e.m.f. are equal and lie in the directions [001],

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The Fermi surface of silver

[110], and [111]. In the zones II of the stereographic projection of the Hall e.m.f. (Fig. 3), the latter depends linearly on the angle. In I, this dependence is almost linear. In the [112] direction, the Hall e.m.f. in the magnetic field tends toward saturation. A distinct maximum of resistivity was established when the magnetic field was in the (001) plane. This 001 characteristic line in the stereographic projection was also found in gold. Distinct maxima of resistivity were found in the lines of intersection between the plane of the magnetic field and the (010) and (100) planes. The only difference in the stereographic projections of the characteristic directions of the magnetic field of the Fermi surface of silver, gold, and copper is found in the dimensions of I. As shown by I. M. Lifshits and V. G. Peschanskiy (ZhETF, 38, 188, 1960), the stereographic projection presented in Fig. 3 corresponds to an open Fermi surface of the type of a spatial network of "corrugated cylinders" with axes parallel to the [001], [110], and [111] directions. Professor I. M. Lifshits and V. G. Peschanskiy are thanked for discussions, Academician P. L. Kapitsa for interest, and V. A. Gromakovskiy for assistance in measurements. There are 5 figures, 1 table, and 14 references: 6 Soviet and 8 non-Soviet. The four most recent references

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The Fermi surface of silver

to English-language publications read as follows: M. G. Pristley. Phil. Mag. 5, 111, 1960; D. Shoenberg. Phil. Mag. 5, 105, 1960; R. W. Morse, A. Myers, C. T. Walker. Phys. Rev. Lett., 4, 605, 1960; J. R. Klauder, J. E. Kunzler. Phys. Chem. Solids, 18, 256, 1961.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems of the Academy of Sciences USSR)

SUBMITTED: July 28, 1961

Fig. 3. Stereographic projection of the main directions of the magnetic field of the Fermi surfaces in silver, gold, and copper.

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B102/B104

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P.

TITLE: The open cross sections of the Fermi surfaces of cadmium, zinc and thallium

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 6(12), 1962, 2094-2104

TEXT: Investigations of the Fermi surfaces of Cd, Zn and Tl single crystals based on measurements of the anisotropy of the electric resistivity of these crystals in strong magnetic fields are reported. $\rho_{300}/\rho_{4.2}$ was equal to about 10,000 for Cd and Tl and 15,000 for Zn. All measurements were made at 4.2°K and in fields of up to 33 koe. In most cases the sample axes were perpendicular to $\vec{H}$, in a few the deviation from orthogonality was 14°. The angular dependence of resistance, $\rho(\vartheta)$ at H=const was determined from automatic records of the emf with an ЭПП-09 (EPP-09) recorder, $\partial\vartheta/\partial t$ was 6.7°/min. Of Cd the axes were oriented along $[10\bar{1}0]$, $[\bar{2}010]$, and $[0001]$, of Zn along $[10\bar{1}0]$, $[\bar{2}110]$,

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The open cross sections of the ...

and [0001] and of Tl only samples with its axes in the [0001] plane were investigated. For Cd the $\varrho(\vartheta)$ curves of the samples with the axes along [10$\bar{1}$0] and [20$\bar{2}$0] were almost equal double-leafs in polar coordinates with deep minima in the directions [$\bar{1}$2$\bar{1}$0] and [0$\bar{1}$10]. The sample with the axis parallel to [0001] showed almost no asymmetry; ϱ grew according to a square law for any direction of $\vec{H}$. Zn samples with their axes parallel to [10$\bar{1}$0] or [$\bar{2}$110] showed, in contradistinction to Cd, a second deep and narrow minimum of ϱ at $\vec{H} \parallel$ [0001]. The sample with its axis parallel to [0001] showed no anisotropy of ϱ, ϱ grew quadratically for any $\vec{H}$ direction. For Tl $\varrho(\vartheta)$ was measured at H=const with about 30 samples whose axes lay in the [0001] plane; $\varrho(\vartheta) \sim \cos^2\vartheta$, $\vartheta = 0$ for $\vec{H} \parallel$ [0001]. ϱ grew linearly for $\vec{H} \parallel$ [0001], for other directions of $\vec{H}$ the growth followed a square law. The results showed that Cd, Zn and Tl possess open Fermi surfaces. For Cd the open trajectories of the conduction electrons in a magnetic field are parallel to [0001], in Zn they are parallel to [0001] or lie in the [0001] plane, in Tl they lie only in the [0001] plane. The stereographic projection of the distinguished directions of the magnetic field for the Fermi surfaces provides explanations of the

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The open cross sections of the ...

anisotropy of Q in all the cases investigated. The topology of the Fermi surfaces is discussed in detail. There are 13 figures.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR
(Institute of Physical Problems of the Academy of Sciences USSR)

SUBMITTED: July 24, 1962

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

GAYDUKOV, Yu.P.

S/056/63/044/004/044/044
B102/B186

AUTHORS: Alekseyevskiy, N. Ye., Gaydukov, Yu. P.

TITLE: Correction to the article "On the sign of the open Fermi surface of zinc" (ZhETF, 43, 2094, 1962)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 4, 1963, 1421

TEXT: Owing to an erroneous analysis of Hall-emf measuring results it had been concluded that the open Fermi surface should be n-type. It is in fact p-type.

ASSOCIATION: Institut fizicheskikh problem Akademii nauk SSSR (Institute of Physical Problems of the Academy of Sciences USSR)

SUBMITTED: February 14, 1963

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"APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514520010-3

L 14523-63 EWT(1)/EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG

ACCESSION NR: AP3005246 S/0056/63/045/002/0071/0082

AUTHOR: Gaydukov, Yu. P.; Itskevich, Ye. S. 63 58

TITLE: Effect of pressure on the Fermi surface of zinc and cadmium

SOURCE: Zhur. eksper. i teoret. fiziki, v. 45, no. 2, 1963, 71-82

TOPIC TAGS: pressurized-zinc-resistivity anisotropy, pressurized-zinc resistivity oscillation, pressurized-zinc magnetic resistance, pressurized-cadmium-resistivity anisotropy, pressurized-cadmium-resistivity oscillation, pressurized-cadmium magnetic resistance, pressurized-zinc Fermi surface

ABSTRACT: The anisotropy of electrical resistivity of zinc and cadmium single crystals was investigated in an 8700-oe magnetic field at a pressure of 7000 kg/cm². The dependence of the resistivity oscillations of zinc along the [0001] axis in a magnetic field under pressures up to 8000 kg/cm² was also studied. A specially designed pressure cylinder was used so that the experiments could be conducted under hydrostatic conditions. It was found that the magnetic resistance of Cd remains unchanged under pressure, but that of Zn decreases by about 20% if the current flow is in the basal plane of the crystal. When the direction of current is parallel to the [0001] axis, the magnetic resistance of both metals decreases

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by 35 to 40%. The resistivity oscillation period in zinc decreases as pressure increases, from 6.3×10^{-5} oe^{-1} at atmospheric pressure to 2.1×10^{-5} oe^{-1} at 8100 kg/cm^2. The magnitude of changes in the Fermi surface in zinc caused by uniform compression was estimated on the basis of the data obtained. The critical pressure at which the open cross sections disappear in the (0001) plane was about 30,000 kg/cm^2. "The authors thank Academician P. L. Kapitsa and Professor G. F. Vereshchagin for making possible this investigation and Professor N. Ye. Alekseyevskiy for his attention." Orig. art. has: 8 figures and 3 tables.

ASSOCIATION: Institut fizicheskikh problem AN SSSR (Institute of Physical Problems, AN SSSR); Institut fiziki vy*sokikh davleniy AN SSSR (Institute of Physics of High Pressures, AN SSSR)

SUBMITTED: 05Mar63 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: PH NO REF SOV: 012 OTHER: 013

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